Indr Poultryman 7/66

BIRD MUSCLES

A notable event for all persons interested in the biology of the chicken in the recent publication of the book entitled "Avian Myology" by George and Berger. It may come as a surprise to you, as it did to me, that enough is known to publish a large scientific book - 500 pages long - on the muscles of birds. Let us hope that this book will do more than collect dust on library shelves. It contains knowledge of potential importance to the broiler industry, which after all, exists for the sole purpose of supplying bird muscles for humans to eat. The more we know about the product we sell, the better equipped we should be to tackle important problems like bruising and bone darkening.

The biology of muscles is understood best by a comparison of different breast muscles. Everyone knows that such muscles provide us with the white meat of chickens and turkeys, but that they are dark in the duck. We also know that the darker breast meat of the duck has more fat than that from chicken breasts. As you might suspect, there is a good reason for this difference. In the wild state the duck is a long distance flier. Although a little slow on the take-off, it is capable of staying aloft for a considerable period of time, and of traveling the length of a continent during migration. The breast muscles in any bird are the main muscles of flight. They are dark in ducks because they contain mostly narrow red fibers. Each fiber has a large amount of myoglobin, a type of hemoglobin, that is especially efficient in withdrawing oxygen from the blood for use by the muscle fiber itself. The myoglobin is red, and this explains the dark color. Duck breast muscles have more fat because the red fibers have globules of fat which is used as the source of energy for flight. Most of you probably know that fat is a much more potent source of energy than carbohydrate; this is the reason why higher feed efficiency is obtained with high fat diets. Therefore, duck breast meat is dark because of myoglobin, and has more fat for use as a concentrated supply of energy. These make long flights possible by providing enough energy and an efficient means of getting oxygen from the blood to burn the fat.

Chicken breast meat is the opposite. It has mostly large fibers that appear white because they lack myoglobin. The meat has less fat, because the main source of energy for any flying the chicken may do is glycogen - a type of carbohydrate, which provides quicker energy but less of it. Few of us have seen the chicken in the wild state so it is difficult to visualize how this type of breast meat would be of any particular advantage. However, our native quail, partridge, and grouse also have white breast meat. The quick energy provided makes it possible for them to take off in a flurry at the approach of danger. They have the ability for a quick take-off and can beat a duck into the air any day. However, such birds never get very far since they have only a small amount of available energy for long distance flight. This explains why a grouse is unable to fly after being flushed several times in a row. The bird has simply used up all the energy reserves of the breast muscles, and is so helpless that it can be easily caught.

Unfortunately, the rest of the muscles of birds have not been studied as much as the breast muscles. We do know, however, that they also are composed of red and white fibers - in different proportions in various muscles and in various birds. Further knowledge on this subject might provide us with valuable clues on the nature of discoloration from bruising. The fact that muscle contains a large amount of myoglobin should be an important item to anyone studying bone darkening. Although this darkening may well be hemoglobin that has come through the bone from bone marrow, it is also possible that some or all of it is myoglobin from the muscle itself! It should not be hard to find the answer to this, and the knowledge gained might be of value in attempts to solve the problem of bone darkening.

Frank H. Wilcox
Associate Professor
Poultry Physiology
Department of Poultry Science
University of Maryland

HELP WANTED

All indications point to an improvement in the comparative economic position of agriculture in the next decade. During the last two decades the poultry industry has experienced a phenomenal growth and with an improvement in general agricultural conditions, the poultry business will rise to new heights. Such an expanding progressive industry is continually seeking new men who will make careers of occupations not yet created.

Currently, though, students with agriculturally oriented training are in real demand in a wide variety of various industries. These include such diverse groups as the food processing industry, drug companies, scientific research, grading and inspection, and many others.

Students in agriculture take essentially the same curriculum in the humanities as most other students, and in addition have a good exposure to basic science with an applied flavor. Several poultry companies are now offering an additional opportunity for training in the form of summer employment of undergraduates. This arrangement has proven highly satisfactory for both the student and the business firm.

To meet the demands of adequate modern-day training, the departments of Animal Science, Dairy Science and Poultry Science at the University of Maryland have combined their undergraduate curriculums into one under the general title of "Animal Science." This program combines into one the salient courses related to animal agriculture. The program makes the maximum use of a student's time by minimizing possible repetition and gives the student some exposure to all of animal agriculture. In addition, to the general College of Agriculture requirements, a student takes a group of courses basic to the animal field and then may select a group of courses that would emphasize poultry production, or a combination of poultry and business. The completed program thus provides the student with an exposure to the liberal arts, some basic science, and some courses of an applied nature in his chosen field.